

AMENDMENTS TO CLAIMS

The listing of claims below replaces prior versions of claims in the application. Claims 1-24 are the originally filed claims and are pending at the time of this present Action.

Listing of Claims:

1. (Currently Amended) A computer-readable medium having computer-executable instructions for performing ephemeral garbage collection, the computer-readable medium being accessible by a computing device, the instructions comprising:

requesting a list from a tracking mechanism, the list identifying memory locations that have been ~~written into~~ accessed since the last ephemeral garbage collection, each memory location corresponding to one of a plurality of cards associated with a card table, wherein the card table identifies one or more cards that have been accessed, each card being associated with one or more objects allocated from within a memory heap;

identifying at least one marked bundle based on the list, wherein the marked bundle corresponds to marked cards that represents a subset of the plurality of cards having associated objects that have been accessed since a last garbage collection process;

for each marked bundle, determining at least one marked cards within the marked bundle;

for each marked card, determining at least one accessed object within the marked card; and

performing garbage collection upon the at least one accessed object.

2. (Previously Presented) The computer-readable medium of claim 1, wherein the tracking mechanism comprises a write-watch mechanism.

3. (Original) The computer-readable medium of claim 2, wherein the write-watch mechanism operates within a memory manager.

4. (Original) The computer-readable medium of claim 2, wherein the write-watch mechanism records a first access to the memory location.

5. (Previously Presented) The computer-readable medium of claim 1, wherein the list comprises a bitmap and each bit within the bitmap corresponds to one of the plurality of cards.

6. (Original) The computer-readable medium of claim 2, wherein the list of memory locations is maintained in response to a request from the ephemeral garbage collection process.

7. (Original) The computer-readable medium of claim 1, further comprising resetting the list of memory locations.

8. (Previously Presented) The computer-readable medium of claim 1, wherein the subset of cards corresponds to a number of cards that are tracked using a page of memory storing the card table.

9. (Original) The computer-readable medium of claim 1, wherein identifying the marked bundle comprises marking a bit associated with the marked bundle within a bundle bitmap based on the memory locations within the list.

10. (Original) The computer-readable medium of claim 9, wherein marking the bit comprises setting the bit.

11. (Previously Presented) The computer-readable medium of claim 1, wherein determining the at least one marked cards comprises scanning a card bitmap having a bit for each of the plurality of cards, the bit for each marked card being different than another bit associated with one of the cards that was not accessed.

12. (Currently Amended) A method for executing statements within a program to support ephemeral garbage collection, the method comprising:

specifying a range of card table memory to watch during program execution, the card table memory identifying prior access to a plurality of cards, each card being associated with and updated upon access to one or more objects allocated within a memory heap, the memory heap being divided into the plurality of cards with each card being grouped into one of a plurality of bundles; and

for each store statement within the program, storing a value at a memory location within the heap memory based on the store statement, marking one of the plurality of cards within the card table memory based on the memory location, and tracking access to the card table memory.

13. (Previously Presented) The method of claim 12, wherein specifying the range of card table memory includes calling a write-watch mechanism that performs tracking of the access to the card table memory.

14. (Previously Presented) The method of claim 13, wherein the write-watch mechanism resides within a memory manager and sets bits in the card table upon access to at least one of the plurality of cards.

15. (Previously Presented) The method of claim 12, wherein a bundle corresponds to a number of cards that are tracked using a page of card table memory.

16. (Previously Presented) The method of claim 13, wherein the write-watch mechanism maintains a list that identifies cards accessed within the card table memory.

17. (Original) The method of claim 16, wherein an ephemeral garbage collection process requests the list when performing a garbage collection cycle.

18. (Previously Presented) The method of claim 16, wherein the ephemeral garbage collection process determines a marked bundle based on the list.

19. (Currently Amended) A system for performing ephemeral garbage collection, the system comprising:

a processor; and

a memory into which a plurality of instructions are loaded and into which a plurality of objects are dynamically allocated, the memory having a heap into which the objects are allocated, the heap being divided into a plurality of cards which are grouped into a plurality of bundles, each card being associated with one or more of the plurality of objects; wherein upon execution of the plurality of instructions by the processor, the system being configured to:

request a list from a tracking mechanism, the list identifying memory locations that have been written into since a last garbage collection cycle, each memory location corresponding to one of a the plurality of cards associated with a card table, wherein the card table identifies one or more cards that have been accessed;

identify at least one marked bundle based on the list, wherein the marked bundle corresponds to marked cards that represents a subset of the plurality of cards having associated objects that have been accessed since a last garbage collection process;

determine, for each marked bundle, at least one marked card within the marked bundle, the at least one marked card indicating that one or more objects associated with the marked card has been accessed;

determine, for each marked card, the one or more objects that has been accessed; and

perform garbage collection upon the one or more accessed objects.

20. (Previously Presented) The system of claim 19, wherein the tracking mechanism comprises a write-watch mechanism.

21. (Currently Amended) The system of claim 20, wherein the write-watch mechanism resides within a memory manager and sets bits in the card table upon access to at least one of the plurality of cards.

22. (Previously Presented) The system of claim 19, wherein the subset of cards corresponds to a number of cards that are tracked using a page of memory storing the card table.

23. (Previously Presented) The system of claim 19, wherein the marked bundle being identified by a marked bit associated with the marked bundle within a bundle bitmap based on the list.

24. (Currently Amended) The system of claim ~~23, wherein the marked bit comprises a set~~ 19, further comprising setting a bit in the card table to identify one or more cards that have been accessed.